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NORTH AMERICAN TORTRICIDÆ.

W. D. KEARFOTT, MONTCLAIR, N. J.

Genus **POLYCHROSIS** Rag.

This genus was enacted by Ragonot* for the reception of the European grape-berry moth *botrana* Schiff, and this species was made the type of the genus. Ragonot, however, omitted to give the generic characters, and as, so far as I am aware, no one else has done so, I add them below.

In 1871 Zeller† identified the American grape-berry moth as *botrona*, and all subsequent workers in this family have followed his conclusions; and in addition have lumped under this name a number of moths whose larvæ feed on very dissimilar food plants.

These identifications can perhaps be accounted for by the reason that all of the species are superficially alike, especially if slightly rubbed, and that seems to be the condition of the majority of the museum specimens I have examined.

With sufficiently long series of perfect bred specimens, however, it is easy to differentiate and even place the rubbed ones where they belong. During the past four years I have been successful in breeding a goodly number of moths from different food-plants, which will be referred to later. The most valuable assistance has been given by Prof. M. V. Slingerland, who has bred large numbers of the grape berry moth from each of its three broods and most kindly permitted me the free use of all the species lumped under this name in the Murtfeldt collection, which is deposited at Ithaca. I am also indebted to him for opportunity to study a number of European specimens of *botrana*, secured through Staudinger and Bang-Hass, and most important he has been good enough to make the beautiful photographs, which are reproduced on Plate XIX.

About twenty specimens were loaned by the National Museum, bred from several food plants and from widely separated localities.

From a very careful study of all of this material I am convinced the American grape-berry moth is specifically distinct from the European, the name *botrana* for our American form most therefore fall, and be replaced by *viteana* Clem.‡

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* Ann. Soc. Ent. Fr. lxiii, 208, 1894.

† Stett. Ent. Zeit. xxxii, p. 179.

‡ Proc. Acad. Nat. Sci. Phila. p. 359, 1860.

It is not at all unlikely that the European *botrona* will be at some time introduced in this country with imported grape vines, and obversely *viteana* may become a native of Europe. But, so far as I have observed, not a single specimen of the real *botrana* has been taken or bred in America. For the sake of comparison it is included in the synopsis and an description added, and for the same reason it will do no harm to have the name awhile longer in our lists.

It is rather peculiar that *botrana* is not recorded from Great Britain—this may be partly accounted for by the reason that most of the grapes grown in England are under glass—but it is hardly a sufficient explanation and the fact that a species common in the south of Europe should pass by England entirely and yet be found abundantly in our Northern States is of a much better argument for the separation than the lumping of the two forms.

The outline of the wings of all the American species here treated differ quite markedly from the European, as can be observed on Plate XX.

In Clemen's original description of *viteana*, it is stated that the larva feeds on the fruit of the grape in September and on the fruit of the wild raspberry in July; Clemens also cites sassafras as the food-plant of another specimen, which was not distinguishable, except from difference in color. The majority of Clemen's types are in the Entomological Section of the Academy of Natural Sciences, Philadelphia, in a remarkably good state of preservation, and among them are two specimens of this species, one is undoubtedly an American grape berry moth and compares exactly with the long series bred by Mr. Slingerland. The second specimen is two badly rubbed for identification. Dr. Packard* says there are two broods of the insect, both on grape. Dr. Saunders† gives a very good figure of the American species and states that there are two broods, the last in the grape-berry and the early brood in young shoots of *vernonia* and on the tulip-tree. Prof. John B. Smith ‡ names thistle, grape, rose and sassafras as food plants.

In the U. S. Nat. Mus. collections are specimens bred from grape-leaves, grape-berry, *liriodendron tulipifera*, *Vernonia novaborascensis*, seeds of *Rhus* and several specimens without names of food-plant. In the Murtfeldt collection are specimens bred from grape-berry, seeds of *Ambrosia trifida* and seeds of *Rhus.*

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* Guide to the Study of Insects, 336, 1869.

† Insects Injurious to Fruits, 298, 1892.

‡ Insects of New Jersey, 493, 1899.

Prof. Slingerland's investigations into this subject have resulted in abundant series of the fall or grape-berry brood, the first spring brood on the flowerets and recently set grapes and the middle brood in the green grape berries. Prof. Slingerland has been successful in discovering and breeding considerable series of both, the mid summer and fall brood on the American wild-grape, which specimens compare exactly with *viteana.* In my own collection are specimens bred from *Liriodendron, Vernonia, Eupatorium* and swamp magnolia.

After critical examination of all this material, over 100 specimens, I feel very positive that each of the food plants support a good valid species, that the different broods do not affect different plants, but that the entire circle of each species is confined to a single plant. This is particularly well illustrated by Prof. Slingerland's work, and in a very much smaller way by my own. In Staudinger's and Bang-Haas Catalogue are twenty species under this genus; we have been satisfied to lump all of ours under one name and that a foreigner.

For want of sufficient material I do not propose to make as many species as we have recorded food plants in this paper, but hope at some later time to be in possession of good series from all the broods from each plant, which will warrant such separation.

POLYCHROSIS Ragonot.

Polychrosis, Rag. Ann. Soc. Ent. France, lxiii, 208, 1894.
Polychrosis, Rag. Staud. and Rebel Catalog Lep. des Pal. Faun. ii, 109, 1901.
Polychrosis, Rag. Fern. Bull. No. 52, U. S. N. M. 449, 1902.

Antennæ in ♂ shortly ciliated, palpi short, do not extend beyond face, outer joint very short, obtuse, tufts on second joint closely compressed, truncate. Thorax with bifid, posterior crest, loosely scaled.

Forewing:—Costa evenly arched, apex rounded, outer margin oblique, very slightly rounded; 1b strongly furcate at base; 1c reaching to and almost concurring with 2; 2 arising from three-quarters of cell; 3 and 4 not connate but arising closer together than 4 and 5; 3 bent sharply and 4 slightly downward beyond origin; 5, 6 and 7 arising at equal distances; 4, 5, 6 and 7 to margin at nearly equal distances apart; 7 to margin below apex, 8 and 9 arising close but not connate; 10 and 11 widely separated from each other and 9.

Hindwing:—With frenulum; uncas not developed; median vein hairy above near base; costa slightly arched to middle, slightly sinuate beyond; apex rounded; outer margin slightly rounded; dorsum same but sinuate between 1b and 2; 1b furcate at base; 1c indicated by a slight fold or thickening; 2 from two-thirds; 4 arising closer to 3 than 5, all separate; 4 and 5 parallel; 6 and 7 connate.

From a European ♂ specimen of *botrana* Schiff. from Staudinger and Bang Hass, through the courtesy of Prof. M. V. Slingerland.

SYNOPSIS OF SPECIES.

1. With large outer marginal patch of front wing indented above anal angle by a spur of ground color...2.
With this patch evenly rounded on outer edge; not indented below. **botrana.**
2. With inner half of front wing uniformly lilaceous or leaden-blue, crossed by well-defined narrow brown lines.................................3.
With inner half much mottled with reddish brown or grey ... .4.
3. With ground color of outer half of front wing rich ochreous-brown. **liriodendrana.**
With ground color of outer half of front wing pale yellowish brown. **viteana.**
4. With dark color of central fascia of front wing extending to dorsal margin. **rhoifructana.**
With this dark color concentrated about and above middle of wing and not reaching dorsal margin............ ....**slingerlandana.**

Polychrosis botrana Schiffermüller.

Tortrix botrana, Schiff, Syst. Verz. Wien, 131, 1776.

Head:—Caps above eyes, the long scales of which meet at upper side of head, very pale brown, flecked and spotted with darker brown, the same color on outer and under sides of palpi. Face and outer sides of palpi whitish yellow or cream color. Eyes large, round and black. Antennæ annulated with cream color and brown.

Thorax:—Front half and shoulders of patagia, dark brown, merging into cream color, overlaid with brown scales in middle of thorax and ends of patagia. A tuft of long raised scales on posterior end of thorax dark brown, almost black and mixed with a few cream-color scales.

Forewing:—Whitish grey, replaced by pale lilaceous grey between fold and dorsum, below costa between half and outer fourth and a small subapical patch. One narrow band at inner fourth and a broader band at middle, of pale olivaceous-brown, interrupted by patches of black scales. A small triangular spot at apex, a large one before apex, two between the latter and the middle fascia, and three on costa between apical spot and fascia, of this same color.

Base:—Whitish grey, mixed with pale fuscous and lilaceous scales, with a few black scales on costa just at junction with thorax, and a few more forming a V-shaped mark on median line, with point of V touching thorax. Just beyond base begins a line or narrow band, black on costa to median vein, thence swelling out in a wide semi-circle to dorsum, black scales replaced at median by light brown, the same color where it touches dorsum. Between basal line and inner fascia whitish grey, with tips of scales darker or light fuscous, below median two small patches of lilaceous scales, each with a few black scales outwardly, and a small black spot on costa. Inner fascia at inner fifth, almost vertical, broad on costa, contracted on both sides a third below costa, broadening out below, and again contracted at dorsum. Color as stated above, black scales on each side of fascia on costa, a ring of black in middle and a small spot on dorsum, with two dots just above it on outer edge of fascia. This fascia is broken by a narrow whitish line that begins just beyond base, over the vein 12 and disappears at middle fascia. Space between inner and middle fascia, whitish grey, this color outlining edges of both fasciæ, edging costa and dorsum, and a streak paralled to and above fold with a narrower streak half-way between latter and costa. Between these whitish streaks color is lilaceous. Two geminate dots on costa fuscous-brown. One geminate and one single black dot on dorsum and three black dots between costa and dorsum, one just below vein 12 touching inner fascia, the other two on outer margin, one a quarter below costa and other a quarter above dorsum. Middle fascia same width on costa as inner fascia, at upper median line broadening outwardly to twice this width, with a right angle spur at middle, of about same width, pointing towards apex, ending abrupting, from lower point of this projection the band sharply contracts to the same width as on costa, at about a quarter above dorsum, below this is a short rounded outward projection, another acute contraction, then a slight swelling and the outer line rounds into the dorsum, where it is narrowest. Color bright olivaceous-brown, the black scales are concentrated in a solid mass occupying all of the fascia between middle of cell to costal vein, involving all of the first outward process and the middle spur. A few black scales at costa on each side of fascia, a short streak of black on fold, a dot on dorsum and a short line and two dots in middle of fascia. A narrow band of ground color runs from fascia, paralleling costa, bending down before apex and ending in a triangular spot on outer margin below and defining apical spot, from this band four rectangular spurs touch costa, defining brown costal spots, the width of spurs and costal spots are about equal. About the middle of this band it joins a vertical band of ground color, slightly wider than the subcostal band, and at a third below costa separating into three branches, the upper branch curves to middle fascia and coalesces with subcostal band, outlining a small diamond spot of brown; the second branch reaches dorsum just beyond fascia, and is sharply indented on both edges above dorsum, the third branch, on outer edge, goes directly to inner angle, with outer edge branching at right angles and ending on outer margin at and above angle. These ground-color bands and branches are partially heavily overlaid with lilaceous-fuscous and lilaceous-blue scales, the former on second branch of lower band and latter on the whole of the subcostal band, more intensely at its inner and outer ends. The four spurs that touch costa are tipped with white on inner and two outer ones, and in each is a small dark costal dot. Two black dorsal dots in second branch and three or four single black or brown scales in central portion, which is the whitest; and a small dark dot on margin. Of the three costal brown spots the first beyond costa is almost entirely overlaid with black, the middle one less so and the outer only black on costa, the apical is larger than the costal spots, is right angled on the basal and dorsal sides, and rounded, following curve of apex outwardly, it is smoky brown, with a black dot in angle. Below is a large semilunate olive-brown patch, inner margin vertical, slightly indented above, straight below, and outer margin evenly curved, touching outer margin from a little above angle to slightly above middle. Evenly shaded smoky brown, several black scales on outer edge. Cilia light brown or fawn, becoming smoky black at and above apex, divided by a paler line.

Hindwing:—Very pale fuscous or whitish, shaded with darker fuscous outwardly; cilia whitish, proceded by a dark fuscous line. Abdomen fuscous above, paler beneath, anal tuft ochreous. Legs dark fuscous, annulate with white. Expanse 12 to 13 mm.

From ♂ and ♀ European specimens.

Botrana is different from all of the American species in having the large subterminal patch rounded outwardly and resting against the lower half of the outer margin, while in *viteana* and allied species this patch is distorted and broken by spurs of ground color; in all the American species a well defined spur enters the patch just above the anal angle, in some species separating the patch from the outer margin. *Botrana* is a much paler or generally lighter colored species than *viteana.* The basal area and inner half ashy grey, crossed by narrow olive green fascia at first quarter and two short ones from dorsum before it. The olive-green central fascia is not unlike an outline map of South America, with Brazil pointing towards apex, but with stem that would represent the Isthmus going vertically to costa. The hindwings are very much paler than *viteana.*

Polychrosis viteana Clemens.

Endopiza viteana Clem., Proc. Acad. Nat. Sci. Phila. 359, 1860.
Carpocapsa vitisella, Rathvon, Prac. Farmer, p. 170, 1868.
Penthina vitivorana Pack., Guide Study Ins., 336, 1869.

Head. thorax, palpi light brown, specked with darker brown, lower and outer sides and tips of palpi and posterior thoracic tuft dark brown.

Forewing:—Ground color, lilaceous-blue, middle fascia and large spots brown, overlaid with much black. Costal spots lighter brown. A dash of white about middle of outer third.

Base to middle fascia lilaceous-blue, inner fascia almost obsolete, represented by a narrow band of black scales, each fringed with light brown, from dorsum but not reaching costa by a quarter, three small spots and two small ones between them of brown-black scales on costa before middle fascia. And in the same space on dorsum four black dots, the dorsal margin narrowly overlaid with light fuscous, brown and black scales, causing a mottled appearance.

The middle fascia is evenly convex on its inner edge, and is of almost even width throughout, except at about middle of wing, the outer edge curves downward and outward at right angles to the band, and then turns abruptly upward to costa (in the curve thus formed rests the white oblique patch) from outer end of this branch the outer line of fascia continues inwardly oblique to costa, slightly indented, the lower half of fascia triangular. Color smoky-black on upper half, a small patch of same at one-third above dorsum, otherwise smoky-brown, lightest at dorsum. Before anal angle is a triangular brown spot. Above the angle an irregular rounded blotch of brown and black, indented at its lower outward corner by a spur of the ground color, its outline also broken by a spur of ground color on its outer upper edge. Apical spot flatly triangular. Ground color of costal margin between fascia and apex, whitish blue, four brown costal spots in this space, the inner a mere outwardly oblique line curving into outer lower end of second spot, latter and fourth are triangular-oblique, third spot rectangular. Below these spots and above the white patch are scattered a few brown scales. Cilia bluish grey, darker at apex and light fuscous at anal angle Underside dark fuscous, whitish below fold, three geminated whitish spots on costa before apex, and a number of others on extreme edge of costa only, between these and base, cilia darker with narrow light subciliate line.

Abdomen smoky black, with metallic reflection, anal tuft silvery-white above, yellowish beneath, tipped with dark fuscous; underside abdomen whitish; legs same inwardly and between joints, outwardly smoky-black.

Hind wing:—Smoky fuscous, lighter towards base, darkest at apex, cilia paler; underside fuscous.

Larva:—9 to 10 mm. Cylindrical, rather robust, tapering from 4 to head and 8 to anal segment. Pale olivaceous-green, with a reddish or purplish tinge from food. Head flattened, slightly bilobed, luteous green on upper parts of lobes, discolored by brown in front; mouth parts and a horizontal dash on side of each lobe below middle black. Pro-thoracic shield large but narrow, luteous brown, bisected by pale green dorsal line. Thoracic feet black, green between joints. Tubercles plates moderate, a slight shade darker than skin, shining. Anal plate not chitinous.

First brood complete, from hibernating pupæ of the complete third and partial second broods; issues in May and deposits eggs in the flowers of the grape, larvæ feed on recently got berries. Second brood not complete, part issuing middle of July and depositing eggs on half-grown grapes, but some of the pupæ of this brood hibernate and do not issue until the following spring; this habit has been observed on both the cultivated and wild grape specimens. Third brood complete, issuing latter part of August and ovipositing on yearly full size grapes, larvæ completing growth and in pupæ by the latter part of September. Pupæ of all broods formed in a neat little flap or envelope cut out of edge or internal part of a leaf.

The ground color of *viteana* and the inner half specially well defined, is a leaden blue or lilaceous-blue, crossed by a narrow chocolate brown line at first quarter. The central fascia is more slender than *botrana,* its outer spur is sharply produced and in some specimens turning upwards towards costa and almost joining submarginal patch. Apical spot is larger and the costal spots before it are smaller than in *botrana.* Hindwings dark brown.

Polychrosis liriodendrana sp. nov.

Head, palpi and thorax light brown, or fawn color, tips of palpi and outer ends of scales forming posterior dorsal tuft dark brown. Antennæ dark fuscous, narrowly annulated with light brown.

Forewing:—Greyish blue, dorsal patch, narrow inner fascia, middle fascia and spots on outer third light brown.

Basal patch barely touches costa, obliquely to dorsum, involving one-fifth of latter, indented twice before median line, light brown at extreme base and blackish fuscous outwardly. The outer edge of inner fascia straight, oblique to fold, thence inwardly oblique to dorsum. On its inner edge it is less distinctly defined, the ground color overlapping it above the fold, below the fold it nearly coalesces with dorsal edge of basal patch, beginning at the fold, in the inner edge, a narrow dash of black scales points towards dorsum. The central fascia is roughly triangular, the inner edge nearly straight and slightly oblique, the outer edge points towards angle for half its length and then obtusely turns obliquely inward to dorsum, color light brown, clouded with dark brown directly on and a quarter below costa, a small black dot on outer margin at widest part; outlined on both sides, except the upper quarter, by whitish scales. Triangular anal angle brown spot lightest towards base, and dark brown running into smoky black at angle and in cilia. Large marginal patch is diamond shape, almost evenly colored dark brown, a narrow line of dark blue or black scales separating the upper part from margin. Above this the costal and apical spots of brown almost exclude the ground color, being separated from each other by narrow whitish bands, through the centre, of which run short narrow lines of blue-black scales. There are but three large costal spots, the inner the largest, roughly rectangular, with an outer spur running towards and almost joining the large marginal patch, the apical spot oblong, slightly pointed at upper and lower ends, light brown on costa, darker below, with an irregular vertical line of blue black scales. Lines of these same scales completely surround it, except where it touches costa, and a short space at apex. The two costal spots between the above are rectangular and less than half the size of the apical spots. Between these four spots short lines of blue black almost touch costa. On costa between middle fascia and first large spot is a small brown dash, with whitish scales on each side, between inner and middle fascia, on costa is a small brown dash and beyond it a small elipse of dark bluish scales, between them the scales are a shade paler than the ground color. Cilia light brown, shaded with smoky fuscous at apex, middle and anal angle, tips of scales white.

Underside smoky-fuscous, with six geminated whitish costal spots. Hindwing pale fuscous internally, becoming smoky-brown outwardly, darkest at apex, cilia paler; underside evenly pale fuscous, with a few dark scales at apex. Abdomen smoky-brown above, pale fuscous beneath, tuft on 12 yellow, on 13 white. Legs whitish, annulated with dark brown. Expanse 11.5 to 12.5 mm.

U. S. Nat. Mus., type No. 8150.

Bred from *Liriodendron tulipifera* L. Second or mid summer brood, larva July 2nd, pupa July 9th, issued July 21st, Montclair, N. J. July 10th to 18th, Washington, D. C. In N. M. are several specimens of third or winter brood, No. 149, also May 7, 1883. I have collected larvæ of this last brood as late as October 15th. The habit of the two broods observed is to spin a narrow text along one side of mid rib, close to the base, as larva grows this tent is extended outward, increasing in width, until it may finally involve a lobe of the leaf.

The larva is well sheltered under this protection, and in a few cases I have found the mid-rib excavated for half an inch or more, the larva retiring into this tunnel when disturbed. The first spring brood may be looked for on the flowers as well as the leaves of the tulip tree. All of the cocoons observed have been made by cutting out and turning over a flap in side or middle of leaf.

Larva 10 to 11 mm. Cylindrical, less robust than *viteana*, slightly tapering, sordid green. Head yellowish brown, ocellic field and lateral dash on lobes black; mouth parts are slightly darker than head; pro-thoracic shield dark brown, thoracic legs black. Anal shield not chitinous.

This is the largest of the American species I have observed. It can easily be separated from others by the rich ochreous color of ths outer half and particularly the apical portion of wing. The subterminal patch is smaller than either of the two preceding species, and is nearly square or diamond shape with points vertical. The costal spots are rectangular in shape.

Polychrosis slingerlandana sp. nov.

Head pale brown; palpi same, darker outwardly, thorax same, sprinkled with dark brown dots, on thoracic tuft the dark brown almost hide the lighter color, except at tips; antennæ pale brown, annulated with dark brown.

Forewing:—Yellowish brownish-fuscous. Basal patch covering inner fourth of wing, brown, heavily overlaid with dark purplish brown, dark color concentrated on costa and dorsum at base and outer margin of patch. Patch is defined by narrow yellowish fuscous line, running obliquely from costa to median, then angled sharply downward to dorsum. Beyond this the outer portion of wing is a mottled mass of yellowish fuscous, brown and dark brown scales, with a few grey and white. There is no well-defined pattern as in the *grape* and *liriodendron* species. Beyond basal patch is an obscurely defined lighter fascia, broken on costa by a geminate central dark spot and a single spot on each side, the upper half of fascia partly overlaid with dark grey and lower half with yellowish fuscous. On the median line the fascia is interrupted by a horizontal black streak, which continues to end of cell and terminates in a small round dot, two other dots the same size are on the upper side of streak, with the spaces between equally divided. From the outer dot an irregular brown line runs obliquely inward, becoming more black than brown when it reaches dorsum at middle. The space enclosed by this line and horizontal streak is dark brown above and lighter below. A dark cloud on dorsum before angle, and between it and brown oblique line are a few scales of grey. Beyond it, before marginal patch, is a much broken band of grey scales from angle to median. Marginal patch large, semi-ovate from costa to angle, touching margin from middle to angle, inner edge nearly straight, where it touches costa it is light brown. Shading into very dark brown to middle and below middle lighter, in the lower half are two small round black spots, vertical to each other, and above them in middle of edge of patch a third spot. The lower half of this patch is outwardly bordered by a narrow black line before the cilia. Beyond dark upper half of patch a faint brown line, interrupted by three whitish dots, and a fourth whitish dot beneath a black small apical spot, between the latter and cilia light brown. A generally paler triangular patch covers costa from just before middle to nearly to apex, bounded inwardly by darker fascia and horizontal dark median streak and outwardly by the generally darker submarginal space. This lighter area, inwardly below costa, is overlaid with a few grey scales, below which is an irregular patch largely mixed with whitish scales. On costa the light space is broken by two equally-spaced shades of darker scales, before the inner shade are two small dots of black. Cilia slaty-grey, outwardly shaded with light fuscous on lower half.

Underside:—Dark smoky-fuscous, veins darker, eight geminated whitish spots on costa; cilia fuscous, with a narrow subciliate whitish line; all the surface below the fold is whitish. Hindwing smoky-black, not shaded. Cilia paler. All surface above vein 8 whitish. Expanse 8 to 9 mm.

U. S. Nat. Mus., type No. 8151.

Bred from *Eupatorium perfoliatum* L. Larva July 6th and 9th, pupa July 15th to 20, issued August 2nd to 9th, Montclair, N. J. I have taken the larvæ of what I believe is the same species about the middle of September, but failed to carry them over the winter. Mid-summer brood tunnelling a passage in the young flower heads, slightly silk lined. The fall brood on the mature flower heads and soft seeds, tunnelling as with second brood. The spring brood can be looked for in young terminal leaves.

Larva 8 to 9 mm. Cylindrical, more robust than *viteana*, slightly tapering, olive-green. Head flattened, chestnut-brown; mouth parts darker brown, ocellic field, lateral dashes, thoracic feet dark brown. Pro-thoracic shield light chestnut brown, darker shaded on posterior edge. Tubercular plates moderate, nearly concolorous, shining. Anal shield not chitinous.

This and the following species are of a different style of ornamentation than the preceding. The ground of *slingerlandana* consists of a mottled mass of ochreous and brown, the lilaceous shades are almost obsolete; the fasciæ and spots are also very illy defined and are almost lost in the prevailing color. Hindwing very dark, smoky-black.

Named in honor of Prof. M. V. Slingerland, of Cornell Experiment Station, whose important economic investigation in the habits of the grape-berry moth, the results of which will shortly appear in a special bulletin, has been the stimulus for the present paper.

Polychrosis rhoifructana sp. nov.

Head and palpi yellowish brown, thorax darker brown. Antennæ dark fuscous, with narrow lighter rings between joints. Eyes black, with greenish reflection.

Forewing:—Basal patch large, occupying inner quarter of wing, mottled mass of smoky-black and lilaceous scales, the black forming an irregular fascia through centre of patch and also another on outer margin of patch, the scales of latter at dorsum becoming brown. Four black dots and four whitish dots on costa within this space, outer line of patch outwardly oblique, irregular and with an acute tooth projecting outwards at fold. Beyond basal patch is a broad whitish fascia, cream and yellowish scales on costa and lower half and lilaceous scales on upper half below costa, one large and two small black dots on costa and several black scales over the lilaceous area. Outer edge of fascia nearly straight. Beyond is a broad dark fascia narrow on costa and dorsum, but swelling out at middle in width equal to a quarter of length of wing; smoky-black scales in upper half, changing to yellowish brown on lower half. Beyond and outlining this is a very irregular whitish fascia, broad on costa and to middle of wing, then contracted and broadening out again to dorsum, where it reaches to anal angle. On costa, in middle of this fascia, is an oblong streak of smoky-brown scales, and a small rounded spot of same on dorsum, a few other dark scales are between these two spots. Submarginal patch is large and touches margin only at middle, smoky-brown, darkest at upper end; inner edge nearly vertical, outer edge evenly rounded, except at lower quarter where it sharply broken or indented by a round whitish spot, having a lilaceous center. Apical spot smoky brown, with cluster of darker scales in center; separated from submarginal patch by line of whitish and lilaceous scales. Three brown costal spots between apex and outer light fascia. Cilia smoky-fuscous, mixed with bluish lilaceous, with a narrow dark inner line. Hind wind dark smoky-fuscous, cilia lighter. Underside of both wings smoky fuscous, with fascia and costal spots of upper surface of forewing repeated in lighter and darker shades of fuscous. Abdomen above smoky-fuscous, tuft yellowish brown, below paler fuscous. Legs fuscous, ringed and spotted with dark brown. Expanse 10.5 to 11.5 mm.

U. S. Nat. Mus., type No. 8152.

In other specimens bred from Sumac the contrast in the whitish and dark brown fasciæ are not so pronounced, caused by the deplacement of the whitish scales by lilaceous or brown. In fact I have very strong doubts of the authenticity of the records of these particular specimens. (Riley, No. 5492, Dept. Agri.) The probabilities are that grape and sumac larvæ have been mixed under this one breeding number.

I have not bred this species, and of the nine specimens before me all are from the hibernating brood, dates of issue December 28th, January 9th, January 28th and March 6, Nos. 3342 and 3343, Insectory, Wooster, O., Murtfeldt collection; January 2nd, January 12th, January 29th, No. 3257, Nat. Mus.; and May 16th and 17th, No. 5492, Nat. Mus., near Rochester, N. Y. All except last two were doubtless forced, leaving middle of May as natural date of emergence. In Prof. C. V. Riley's unpublished notes at Dept. Agriculture, Washington, No. 5492, is supposed to be the same insect mentioned by Packard, p. 665, Fifth Report U. S. Ent. Com., as a "Sumac Leaf Roller," this is an error, as the larvæ mentioned by Packard produces *Episimus argutanus* Clem.

The following additional specimens have been bred, the records will no doubt be of service to future workers.

On *Vernonia noveboracensis* L. (iron weed.) In flower heads, tunnelling and lining galleries with thin silk, larva July 27th, issued August 9th, Caldwell, N. J. No. 3557, Nat. Mus., issued May 22d. Another Nat. Mus. specimen bears a small label "From *Vernonia* June 15, 80," and a large label "A small *Gelichid.* This "is a ♀ of a species of *Gelichia* allied to *Evapora apicidripunctella* "Clem. (signed) Walsingham 1886"—of course, a wrong determination. One specimen, Murtfeldt coll. "No. 3557 Iss. May 12," and another Murtfeldt specimen with this label "Larva $\frac{1}{3}$ inch long, "livid dark brown, head fuscous, piliferous spots glassy, hairs rather "long. Very active, feeds in young shoots of *V. nove.* In changing to pupa forms a small cylindrical case from a bit of leaf, iss. "July 3, 79."

I have taken larvæ in flower heads and seeds of *Vernonia* betweed middle and last of September, which I think are this species, but failed to carry them through the winter. The moth is very close to *slingerlandana*, but a series of perfect bred specimens are necessary to define the differences.

On *Ambrosia trifida* L. (horse cane, great rag-weed). One specimen, Murtfeldt collection, "From larva feeding in seeds of *A. trifida*, Apl. 25, 1884." This is allied to *rhoifructana*, but seems distinct.

On *Magnolia virginiana* L. (swamp or laurel magnolia). One specimen, Dist. Col. Larva August 1st, pupa August 7th, issued August 15th. Larva in mid-rib tent on underside of leaf, pupa in flap cut out of edge or interior of leaf. August 1st, near Moorestown, N. J., in a swampy piece of woods. Nearly every magnolia leaf showed the work of this larva, including the tent and cocoons, each of latter with empty pupal shell projecting from it. Unfortunately no live specimens were to be found.

Also reported as bred from Sassafras, wild-raspberry and thistle. I have not seen any of these specimens, and have no doubt that a number of others will be found in other food plants, as soon as a determined effort is made to secure them by breeding. It is rather notable that almost no flown specimens are to be found in any of the large collections. I have two taken at Anglesea, N. J., May 25th at light. The moths are quite small and obscure looking, and it is probable they are not easily disturbed in the daytime, hence their apparent rarity, but they can be bred with very little effort, and I believe will eventually be found to be very common and widely distributed.

At the present time (October 15) I have in pupæ most of the above species as well as others that I believe to belong to this genus from a number of food plants.

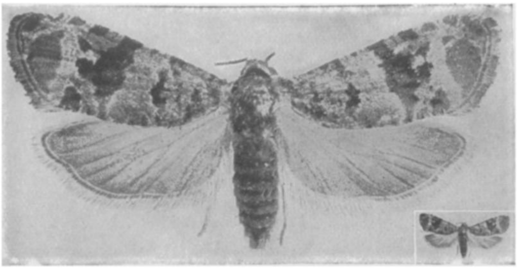
EXPLANATION OF PLATES.

PLATE XIX.

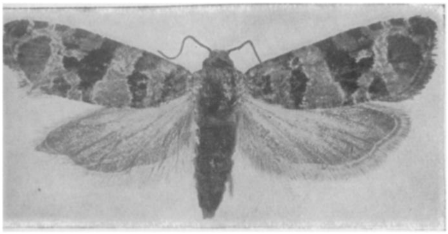
Fig. 1–2.—*Polychrosis botrana* Schiff.
" 3. " *rhoifructana* Kearf.
" 4. " *slingerlandana* Kearf.
" 5. " *viteana* Clem.
" 6. " *liriodendrana* Kearf.

PLATE XX.

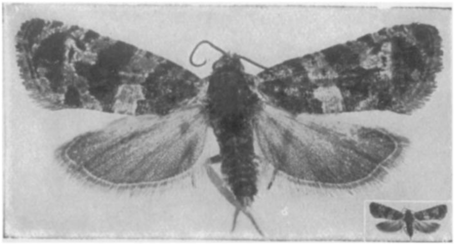
Fig. 7–8.—Venation, *Polychrosis botrana* Schiff.
" 9. " " *viteana* Clem.
" 10. " " *liriodendrana* Kearf.
" 11. " " *slingerlandana* Kearf.
" 12. " " *rhoifructana* Kearf.



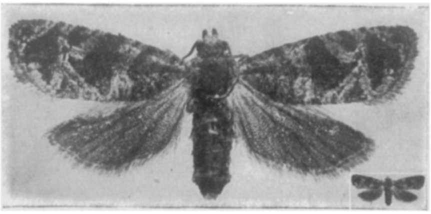
1—P. BOTRANA SCHIFF.
(EUROPE)



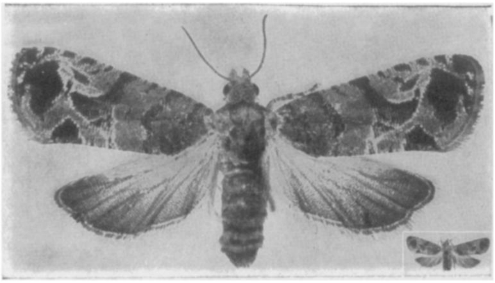
2—P. BOTRANA SCHIFF.
(EUROPE)



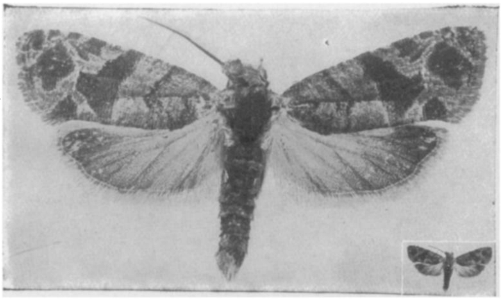
3—P. RHOIFRUCTANA KEARF.



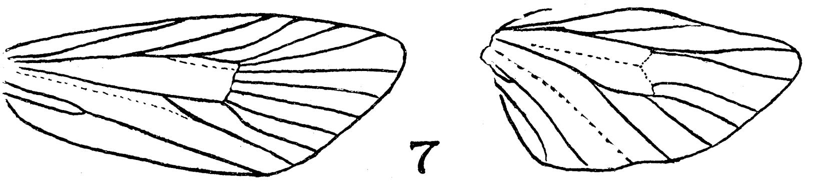
4—P. SLINGERLANDANA KEARF.



5—P. VITEANA CLEM.



6—P. LIRIODENDRANA KEARF.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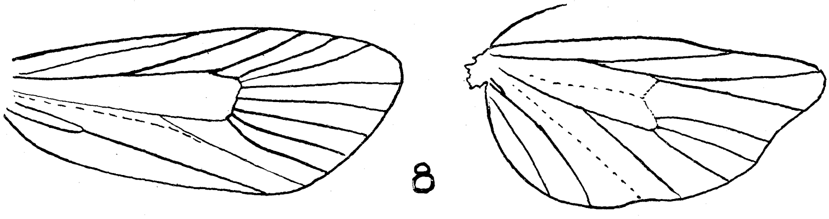
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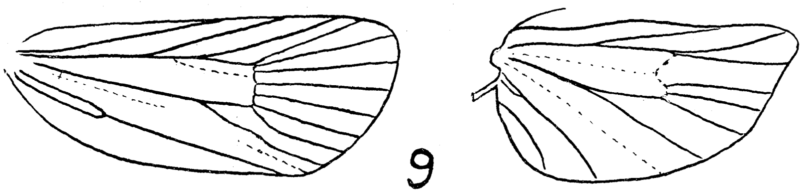
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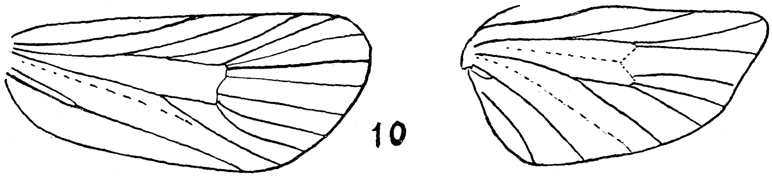
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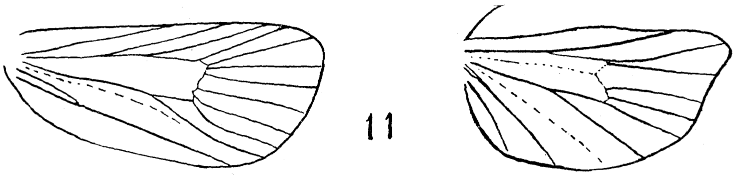
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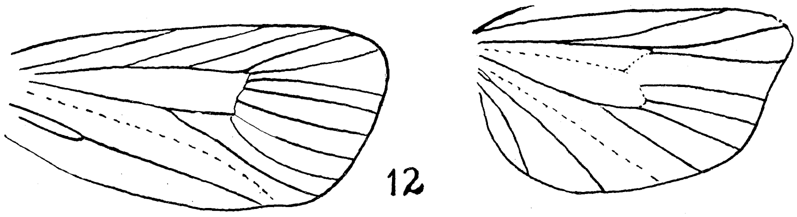
12

FIG 7.—POLYCHROSIS BOTRANA SCHIFF.

FIG. 8.— " " "

FIG. 9.— " VITEANA CLEMENS.

FIG. 10.—POLYCHROSIS LIRIODENDRANA KEARF.

FIG. 11.— " SLINGERLANDANA KEARF.

FIG. 12.— " RHIOFRUCTANA KEARF.